

Application Serial No. 10/823,105  
Reply to office action of March 8, 2006

PATENT  
Docket: CU-3682

**REMARKS/ARGUMENTS**

Reconsideration is respectfully requested.

Claims 1-12 were pending in the present application before this amendment. By the present amendment, claim 2 is canceled without prejudice; and claims 1 and 4 are amended. No new matter has been added.

In the office action, claim 4 stands rejected under 35 U.S.C. §112, ¶2, as being indefinite. The examiner indicates that it is unclear which is the particle and which is the nanoparticles. Further, the examiner notes insufficient antecedent basis with respect to "nanoparticles" and "liquid crystal molecules."

In response, all appropriate corrections have been made to claim 4, and claim 4 overcomes the standing rejection when it is understood in combination with the limitations of claim 1. The support for the amendment to claim 1 is found at least in the specification page 12, lines 7-9. The applicant respectfully submits that claim 1 as amended resolves the standing rejection under 35 U.S.C. 112. Withdrawal of rejection is respectfully requested.

In the office action, claims 1-2 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,376,029 (Suzuki).

**Suzuki** discloses the fine particle comprising a core coated with a protective layer of a cholesteric liquid crystal film. Suzuki further discloses that core diameter is usually in the range of 0.1 to 5,000  $\mu\text{m}$ , preferably 0.3 to 500  $\mu\text{m}$  (Suzuki col. 4, lines 2-3).

In Suzuki, the material of the protective layer for the core is restricted to the

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cholesteric liquid crystal and the selective reflection for a light of a specific wavelength which is a function unique to the cholesteric liquid crystal is utilized. Accordingly, the helical axis of the cholesteric liquid crystal is perceived as vertical to the core fine particle surface. This is because the cholesteric liquid crystal can reflect the incident light entering vertically to the core fine particle surface by the helical axis of the cholesteric liquid crystal being vertical to the core fine particle surface. When the helical axis orients vertical to the core fine particle surface, the long axis of the cholesteric liquid crystal molecules orient vertical to the helical axis, and thereby the long axis of the cholesteric liquid crystal molecule orient parallel to the core fine particle surface.

Therefore, the invention of Suzuki is directed to binding the cholesteric liquid crystal molecules together by the liquid crystal molecules being arranged parallel to the core fine particle surface. In order to form the arrangement stably, it is easily assumed that the liquid crystal molecules must be constrained parallel to the core surface by having the length of the molecule long axis equal to or shorter than the core fine particle diameter and enlarging the contact area between the liquid crystal molecules and core surface to generate an electrical interaction on the core surface. This is suggested by the very fact that Suzuki restricts the size of the core fine particle to the range of 0.1 to 5,000  $\mu\text{m}$ , preferably 0.3 to 500  $\mu\text{m}$ .

As mentioned, in Suzuki, it is difficult to arrange the long axis orientation of the cholesteric liquid crystal parallel to the core fine particle if the core fine particle diameter is smaller than 100  $\mu\text{m}$ . Therefore, the effect characteristic to the invention of Suzuki cannot be achieved with the core fine particle having a diameter smaller than 100  $\mu\text{m}$ . In other words, it is strongly indicated that the core fine particle diameter must not be

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smaller than 100  $\mu\text{m}$  in Suzuki.

On the other hand, in the **presently claimed invention**, the liquid crystal material comprising the protective layer is not particularly limited to the cholesteric liquid crystal as long as it has a good compatibility to the liquid crystal material used in the liquid crystal layer. Therefore, there is no problem caused by the restriction imposed that the core fine particle diameter is smaller than 100  $\mu\text{m}$ . Instead, the presently claimed invention utilizes the quantum size effect of the nanoparticle itself and the frequency dispersion characteristic of dielectric constant originated from the Maxwell-Wagner effect. Therefore, to have its advantageous effect, it is an essential requirement in the present invention that the core fine particle diameter is smaller than 100  $\mu\text{m}$ .

Accordingly, the presently claimed invention as recited in claim 1 comprises the core fine particle smaller than 100  $\mu\text{m}$ , which has a different diameter size range from that of Suzuki. Therefore, the presently claimed invention overcomes the current rejection under 35 U.S.C. 102(b).

Further, the presently claimed invention as recited in claim 1 is not obvious over Suzuki, since Suzuki discloses a description which denies the indispensable feature of the presently claimed invention: --a core fine particle diameter smaller than 100  $\mu\text{m}$ --. Therefore, the presently claimed invention recited in claim 1 does not fall under 35 U.S.C. 103(a), although the examiner did not specifically reject claim 1 under §103 cited Suzuki.

All of the claims 3-12 encompass the features of claim 1, which is respectfully submitted to overcome the standing rejection over the cited references for the reasons

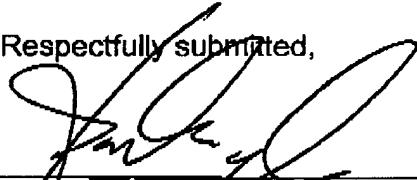
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above. Thus, claims 3-12 are considered to be in condition for allowance at least since claim 1 is considered to be in condition for allowance over the cited references.

For the reasons set forth above, the applicant respectfully submits that claims 1 and 3-12, now pending in this application, are in condition for allowance over the cited references. Accordingly, the applicant respectfully requests reconsideration and withdrawal of the outstanding rejections and earnestly solicits an indication of allowable subject matter. This amendment is considered to be responsive to all points raised in the office action. Should the examiner have any remaining questions or concerns, the examiner is encouraged to contact the undersigned attorney by telephone to expeditiously resolve such concerns.

Respectfully submitted,

  
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